less frequently done than either of the two previously mentioned operations. As a primary operation it is resorted to in cases of stone associated with severe infection, tumor, or tuberculosis. In these cases, results are very much better following nephrectomy than nephrotomy, provided, of course, that the other kidney is present and functioning as discussed above. Secondary nephrectomy must be resorted to in cases of persistent fistula after other operative measures have failed to effect a cure; in cases of recurrence of stone, persistent infection of the kidney after the primary removal of calculi, and for the relief of uncontrolled secondary hemorrhage following nephrotomy or pyelotomy.

Nephrectomy is the most serious of the operative measures for the relief of stone, but the ultimate result, as regards recurrences, is better than with the other two operative procedures.

Hemorrhage is one of the most serious complications of nephrectomy. It usually occurs after the kidney has been cut from its pedicle and the clamp removed, but it may be due to other causes, such as failure to include the vessels in the ligature, placing the second ligature over the first, which may render the first one ineffective, and cutting the ligature when the kidney is removed. Slight oozing can usually be controlled with hot pads, but large hemorrhages are difficult to manage, since the wound rapidly fills with blood so that one cannot see. When hemorrhage occurs, the clots should be wiped out with hot pads and the site of the bleeding found. If this can be done, the bleeding vessel should be grasped with a pair of forceps and ligated. If the bleeding point cannot be seen, grasping the pedicle and exercising firm pressure with the fingers may be successful. This procedure will often allow the clots to be removed; thereby time for examination is gained and also knowledge just where the clamp should be applied. In instances where the operator attempts to stop profuse hemorrhage, injuries to the bowel by means of the clamp are prone to occur. At times the hemorrhage occurs from an accessory vessel; and, although this may be profuse, it never reaches the same proportions as does a hemorrhage from the pedicle. Bleeding may also occur from the vena cava, as a result of direct injury during operation.

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Neuro-arthropathies: A Consideration of the Etiology and General Characteristics—It is the belief of Herman B. Phillips and Charles Rosenheck, New York (Journal A. M. A., January 5, 1924), that neuro-arthropathies caused by peripheral nerve disease or injury or other factors not definitely understood may occur with more frequency than is usually believed. These neuro-arthropathies are possibly misinterpreted, on account of the absence of demonstrable disease of the central nervous system. In the wake of such misinterpretation, extensive joint operations may be performed unnecessarily, as in one case cited. The possibility of neuro-arthropathy should always be considered in obsoure or ill-defined joint manifestations, even in the absence of cord disease. The etiology may be found in disturbances of the peripheral neural apparatus or other hitherto unknown factors.

JUSTIFICATION FOR STERILIZATION BY EITHER SURGICAL OR RADIOLOGICAL METHODS

By REX DUNCAN, M. D., Los Angeles, California

The literature is abundant with most excellent articles dealing with the causes and treatment of sterility, but much less of scientific merit has been published pertaining to the justification for sterilization. Indication for sterilization broadly may be included under two heads. First, medical or those in which, because of some pathological condition in the woman, it is necessary to prevent pregnancy that her life may not be endangered. In advanced pulmonary tuberculosis, nephritis, diabetes, advanced cardiac lesions or other constitutional disturbances which would render pregnancy dangerous to the life of the woman, sterilization is indicated. In uterine cancer, fibroids, certain inflammatory conditions of the pelvic organ and other conditions in which sterilization would necessarily follow, appropriate treatment is undoubtedly justified. In women with deformed pelves or other conditions where delivery would require cesarian section or other dangerous operative procedure, it is a question to be determined by the patient, family, and physician. Statistical studies show quite clearly that pregnancy favors the recurrence of malignant diseases in breast cancer and malignant diseases of the genital organs, and while these conditions quite commonly occur after the child-bearing period, sterilization is undoubtedly indicated. Without entering into a detailed discussion of the numerous pathological conditions in which it might be indicated, it would seem that the woman's life should receive first consideration and it is, therefore, justifiable to produce sterilization in any of those conditions in which it might be demonstrated after proper consultation that pregnancy would endanger the life of the woman.

Secondly, the justification of sterilization for social or economic reasons or from a purely eugenic standpoint are subjects in which there is a great variance of opinion and permissible of considerable discussion. The attitude regarding sterilization for social reasons is rapidly changing. Undoubtedly, it is worthy of more thought. However, further discussion will be omitted here.

It is, of course, a well-established fact that sterilization may be produced either by surgical or radiological methods. The method to be chosen necessarily depends somewhat upon the pathological conditions rendering such a measure justifiable or permissible, the numerous indications for which need not be outlined here. Sterility may be produced by a single intra-uterine application of 2500 or more millicurie hours of radium which may be given in from four to 24 hours, depending upon the quantity of radium used or by the use of X-ray treatment over the pelvis, using such technique that the ovaries will receive approximately an erythema skin dose. This may be accomplished with high voltage X-ray equipment in one or two applications totaling approximately one hour.

While radium is commonly employed in the treatment of certain pathological conditions of the pelvis without producing sterility, sterilization pro-

duced by means of either X-ray or radium produces an amenorrhea and is associated with the usual menopausal changes. The nervous manifestations, however, are, as a rule, less prolonged and less severe than the normal or following radical surgical procedure.

Radium or X-ray is contra-indicated in the presence of acute or subacute pelvis infection. On the other hand, radiological methods are particularly appropriate in cases of severe tuberculosis or other local or constitutional diseases that would render the individual a poor surgical risk.

Because of the safety and simplicity of sterilization by radiological methods, this procedure is to be preferred to surgical means in all cases excepting those in which abdominal surgery may be indicated for the correction of some existing pathological condition, acute pelvis infection or in young women where menopausal changes are not desired.

Lay Advertising and Child Welfare — Under this heading, Frank V. Bogert (N. Y. State Journal of Medicine) says: "Never has the danger of a little knowledge been more prettily demonstrated than in the matter of public education in regard to diet. Producers of proprietary foodstuffs, in exploiting their wares, have reached a point so close to the limits of honesty that their pernicious teachings must be reckoned with in the promotion of public health. More especially does this concern the worker among children, who, dealing with the more delicate digestive apparatus of the young, an apparatus which must be protected and developed for the future, also deals with a group more vulnerable to temptation and managed dietetically by overzealous guardians. To the average mother, today, the one important consideration is to obtain the ingestion of sufficient calories, vitamines, iron, and salts by tempting, urging, coaxing, and force without regard to needs and ability to assimilate. The intemperate prohibitionist likes to believe that one can't eat too much. Weight is too often made the standard of health and the undernourishment of overfeeding is treated by more food. . . .

Every pernicious dietetic habit that we have been endeavoring for years, and with some success, to eliminate is openly encouraged. Overfeeding, underfeeding, between-meals feeding, unintelligent stimulation of the appetite, candy and sweet-eating in excess, all, are advocated by the selfish world of business in order to increase consumption. . . .

When we know that the sensible method of establishing a normal appetite is to keep food away until it is desired, our patients are advised to eat catsup to make the foods they 'like best taste better' and a brand of soups is advertised as 'your appetite's temptation.' Tonics, condiments and stimulating sauces are too commonly given to children because they are relished and because they increase food intake, and, in these days of undernourishment, justification is gladly found and the practice continued to the child's undoing."

The Business Side of the Doctor's Service—"From January 1, 1924," says a St. Louis doctor in a circular letter to his patients, "my practice will be on a business basis.

"I am compelled to pay office rent, drug bills, phone, light, gas, tires, etc., monthly and **promptly.** In consequence, I do not deem it just that I should render my services and supply drugs gratis or on an indefinite payment. Patients unable to pay, mentioning the fact, will be treated as promptly as before; those **able** to pay, and who **do not,** will oblige me by not calling me."

THE EVOLUTION OF ROENTGEN THERAPY IN HIGHER VOLTAGES *

By ALBERT SOILAND, M. D., Los Angeles

Two years have now elapsed since the present short-wave form of X-rays came into radiological favor in America, and it is now perhaps timely to venture some comments upon this theme.

For a great many years our most successful field of radiotherapy has been in lesions of the skin and subcutaneous tissues. For this work every conceivable type of electrical generator imaginable has been employed. Anything which would make a vacuum tube turn pink, blue, or green has been used with which to treat all ills that are the heritage of mankind. Little by little the pink and the blue tubes were placed in the discard, and gradually the intrepid radiologist essayed to delve deeply into the human anatomy, and finally succeeded in demonstrating beyond the possibility of a doubt that physiological and pathological response could be elicited upon structures below the body's exterior. Finally came some order out of chaos, and attempted measurements of all electrical factors entering into X-ray production brought forth a tabulation of units, destined to place Roentgen ray treatment upon a relatively scientific basis. From an uncertain and flickering voltage, giving rise to a phantom X-ray stream, there has come today a powerful generator with almost unbelievable capacity delivering through specially designed hot cathode tubes a force unseen and almost unknown, the remote effects of which we are all struggling to direct and understand. This progress, from our first feeble attempts to radiate the human skin surface to our present ability, to saturate the innermost recesses of the human body, has all been accomplished in the comparatively brief space of twenty-five years. You all know the many interesting periods of transition, of doubt, of struggles, of superstition—yes, even of death among some of our martyred pioneers—yet the science has emerged triumphant, and that which once eluded us is fast becoming our willing slave.

The present discussion will deal with the problems of deep therapy and the evolution of the higher voltages. We will, therefore, omit reference to skin and superficial radiation, and state briefly that it is now quite possible, by varying the factors of our operation, to inundate a desired depth field, with the knowledge that in this field a fairly constant effect of the energy of radiation may be obtained.

For the purpose of illustration, we may roughly state that, with a voltage of 200,000 at a 50 centimeter skin distance and with 10 millimeters of aluminum filter, effective radiation may be apparent four inches below the skin surface. With the same voltage and 15 millimeters of aluminum filter, an efficient but smaller amount of energy of radiation may be delivered six inches below the skin surface. With 20 millimeters of aluminum filter, a still smaller quantity of effective rays reach an eight-inch distance below the skin. This table is, of course, only relative, but it will serve to illustrate

* Presented to the Section on Radiology at the Fifty-second Annual Session of the California Medical Association, San Francisco, June, 1923.